

WHAT IS CLAIMED IS:

1. A method of installing a latch profile in a tubular string in a
5 subterranean well, the method comprising the steps of:

positioning the tubular string in the subterranean well; and
then forming the latch profile in the tubular string.

2. The method according to Claim 1, wherein the forming step further
10 comprises conveying the latch profile into the tubular string and then outwardly
expanding the latch profile in the tubular string.

3. The method according to Claim 2, wherein the expanding step
further comprises deforming the tubular string, thereby recessing the latch
15 profile into the tubular string.

4. The method according to Claim 3, wherein the deforming step
further comprises plastically deforming the tubular string so that the tubular
string is expanded outward.

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5. The method according to Claim 2, wherein the conveying step further comprises conveying the latch profile internally formed on an expandable structure.

5 6. The method according to Claim 5, wherein the expandable structure is circumferentially continuous, and wherein the outwardly expanding step further comprises circumferentially stretching the expandable structure, thereby radially enlarging the expandable structure.

10 7. The method according to Claim 5, wherein the expandable structure includes multiple circumferentially distributed segments, and wherein the outwardly expanding step further comprises displacing each of the segments radially outward.

15 8. The method according to Claim 5, wherein the outwardly expanding step further comprises displacing a wedge structure through the expandable structure.

9. The method according to Claim 5, further comprising the step of
20 bonding the expandable structure to the tubular string.

10. The method according to Claim 9, wherein the bonding step further comprises adhesively securing the expandable structure to the tubular string.

11. The method according to Claim 9, wherein the conveying step
5 further comprises conveying the expandable structure into the tubular string with a bonding agent carried on the expandable structure.

12. The method according to Claim 11, wherein in the conveying step, the bonding agent is an adhesive.

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13. The method according to Claim 11, wherein in the conveying step, the bonding agent is a sealant.

14. The method according to Claim 1, further comprising the step of
15 conveying a whipstock assembly into the tubular string prior to the forming step.

15. The method according to Claim 14, wherein the conveying step further comprises conveying with the whipstock assembly an apparatus for forming the latch profile in the tubular string.

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16. The method according to Claim 15, wherein the conveying step further comprises conveying the whipstock assembly attached to the apparatus.

17. The method according to Claim 15, further comprising the step of engaging the whipstock assembly with the latch profile, thereby securing the whipstock assembly against displacement relative to the tubular string, after the
5 forming step.

18. The method according to Claim 17, wherein the conveying, forming and engaging steps are performed in a single trip into the tubular string.

10 19. The method according to Claim 1, wherein the forming step further comprises forming the latch profile so that a minimum internal dimension of the profile is substantially equal to or greater than a minimum internal diameter of the tubular string.

15 20. The method according to Claim 1, further comprising the step of cementing the tubular string in the well prior to the forming step.

21. The method according to Claim 1, wherein the forming step further comprises forming at least one recess on an interior surface of the tubular string.

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22. The method according to Claim 21, wherein the forming step further comprises forming the recess so that the recess is circumferentially continuous.

5 23. The method according to Claim 21, wherein the forming step further comprises forming multiple ones of the recesses.

24. The method according to Claim 23, wherein the forming step further comprises spacing apart the recesses in a predetermined pattern, thereby
10 facilitating radial orientation of an apparatus engaged with the recesses after the forming step.

25. The method according to Claim 1, wherein the forming step further comprises piercing the tubular string, thereby forming at least one opening in a
15 sidewall of the tubular string.

26. The method according to Claim 25, wherein the forming step further comprises forming multiple ones of the openings.

20 27. The method according to Claim 26, wherein the forming step further comprises spacing apart the openings in a predetermined pattern, thereby

facilitating radial orientation of an apparatus engaged with the openings after the forming step.

28. The method according to Claim 25, further comprising the step of
5 injecting a sealant into the opening, thereby preventing fluid flow through the tubular string sidewall via the opening.

29. A method of installing a latch profile in a tubular string in a subterranean well, the method comprising the steps of:

cementing the tubular string in the subterranean well; and

then plastically deforming the tubular string, thereby installing the latch
5 profile in the tubular string.

30. The method according to Claim 29, wherein the deforming step further comprises positioning an expandable latch structure within the tubular string, the latch structure having the latch profile formed thereon, and then
10 outwardly expanding the latch structure.

31. The method according to Claim 30, wherein the expanding step further comprises outwardly displacing a sidewall of the tubular string, thereby recessing the latch structure into the sidewall.

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32. The method according to Claim 30, wherein the expanding step further comprises displacing a wedge through the latch structure, thereby outwardly displacing the latch structure.

20 33. The method according to Claim 30, wherein in the positioning step, the latch profile formed on the latch structure is an orienting profile, so that an

apparatus engaged with the profile after the deforming step is radially oriented relative to the tubular string.

34. The method according to Claim 29, wherein the deforming step
5 further comprises forming recesses in a predetermined pattern on an interior surface of the tubular string, the pattern of recesses making up the latch profile.

35. The method according to Claim 34, wherein the forming step
further comprises circumferentially continuously forming at least one of the
10 recesses.

36. The method according to Claim 34, further comprising the step of
engaging an apparatus with the recesses after the forming step, the
predetermined pattern thereby radially orienting the apparatus relative to the
15 tubular string.

37. The method according to Claim 29, further comprising the step of
engaging an apparatus with the latch profile after the deforming step, thereby
securing the apparatus relative to the tubular string, the deforming and engaging
20 steps being performed in a single trip into the tubular string.

38. The method according to Claim 29, further comprising the step of bonding the latch profile to the tubular string.

39. The method according to Claim 38, further comprising the step of
5 forming a seal between the tubular string and a latch structure on which the latch profile is formed.

40. A method of installing a latch profile in a tubular string in a subterranean well, the method comprising the steps of:

positioning the tubular string in the subterranean well; and

then cutting into an interior surface of the tubular string, thereby forming
5 a predetermined pattern of recesses on the interior surface, the pattern of recesses making up the latch profile.

41. The method according to Claim 40, further comprising the step of engaging an apparatus with the recesses after the cutting step, the predetermined
10 pattern thereby radially orienting the apparatus relative to the tubular string.

42. The method according to Claim 41, wherein the cutting and engaging steps are performed in a single trip into the tubular string.

15 43. The method according to Claim 40, wherein the cutting step further comprises extending the recesses through a sidewall of the tubular string, thereby forming openings in the sidewall.

44. The method according to Claim 43, further comprising the step of
20 injecting sealant into the openings, thereby preventing fluid flow through the openings.

45. The method according to Claim 40, wherein the cutting step is performed by drilling into the interior surface.

46. The method according to Claim 40, wherein the cutting step is
5 performed by milling the interior surface.

47. A method of installing a latch profile in a tubular string in a subterranean well, the method comprising the steps of:

positioning the tubular string in the subterranean well;

then conveying a latch structure into the tubular string; and

5 then expanding the latch structure outward in the tubular string.

48. The method according to Claim 47, wherein the expanding step further comprises expanding the latch structure outward into contact with the tubular string.

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49. The method according to Claim 47, wherein the expanding step further comprises forming a seal between the latch structure and the tubular string.

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50. The method according to Claim 49, wherein the seal forming step further comprises positioning a bonding agent between the latch structure and the tubular string.

51. The method according to Claim 49, wherein in the seal forming
20 step, the seal is a metal to metal seal.

52. The method according to Claim 47, wherein the expanding step further comprises securing the latch structure relative to the tubular string.

53. The method according to Claim 52, wherein the securing step
5 further comprises positioning a bonding agent between the latch structure and the tubular string.

54. The method according to Claim 52, wherein the securing step further comprises producing metal to metal contact between the latch structure
10 and the tubular string.

55. The method according to Claim 52, wherein the securing step further comprises axially and rotationally securing the latch structure relative to the tubular string.

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56. The method according to Claim 47, further comprising the step of orienting the latch structure rotationally relative to the tubular string prior to the expanding step.

20 57. The method according to Claim 56, wherein the orienting step further comprises rotationally orienting a muleshoe of the latch structure relative to the tubular string.

58. The method according to Claim 56, wherein the orienting step further comprises rotationally orienting a laterally inclined surface of the latch structure relative to the tubular string.

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59. The method according to Claim 47, wherein the expanding step further comprises displacing a wedge through the latch structure.

60. The method according to Claim 47, wherein the expanding step
10 further comprises deforming the tubular string.

61. The method according to Claim 60, wherein the deforming step further comprises plastically deforming the tubular string so that the tubular string is expanded outward.

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62. The method according to Claim 47, wherein the latch structure is circumferentially continuous in the expanding step.

63. The method according to Claim 62, wherein the expanding step
20 further comprises circumferentially stretching the latch structure.

64. The method according to Claim 47, wherein the latch structure is made up of multiple circumferentially distributed segments in the expanding step.

5 65. The method according to Claim 64, wherein the expanding step further comprises displacing each of the segments radially outward.

66. The method according to Claim 47, wherein the expanding step further comprises expanding the latch structure so that a minimum internal
10 dimension of the latch structure is substantially equal to or greater than a minimum internal diameter of the tubular string.

67. The method according to Claim 47, wherein the expanding step further comprises expanding the latch structure so that a minimum internal
15 dimension of the latch structure is substantially equal to or less than a minimum internal diameter of the tubular string.